

# **ESP8266 Networking**

**February 14th, 2015 in Labitat**



# Plan for the afternoon

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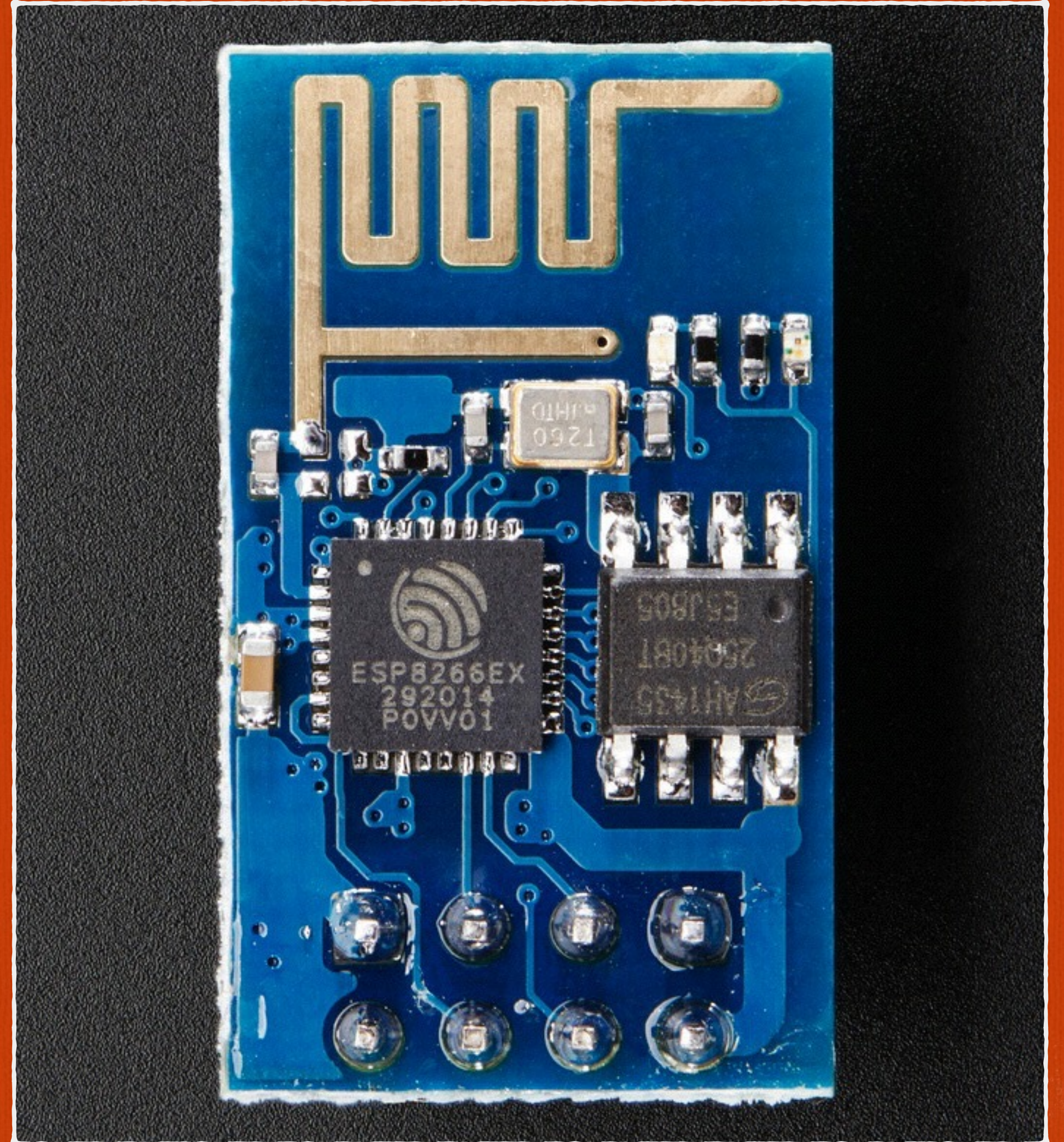
- ☐ Welcome
- ☐ Short introduction to the ESP8266
- ☐ Hands-on exploring of functionality
- ☐ Helping each other to get “connected”



# The ESP8266

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What is it?





# The ESP8266

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- ☐ It's a RISC microcontroller with build in WiFi
- ☐ Made by Chinese chip maker Espressif Systems ([espressif.com](http://espressif.com))
- ☐ Most often sold as modules on eBay, usually with a firmware that exposes an AT command API
- ☐ Relatively cheap compared to other WiFi modules and available in low volume



# Interface

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- ☐ It's all 3.3 V logic, and isn't "officially" 5 V tolerant, but tests have shown that it does not die instantly if used with 5 V signals, but it should be powered with 3.3 V
- ☐ Default communication is a UART with an AT command interface
- ☐ I found that 115200, 8, n, 1 worked with a new module



# Talking to an Arduino

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- ☐ Most Arduinos run at 5 V, so ideally you need some sort of level shifting
- ☐ Cheap and easy is two resistors (eg 1K + 1.8K) used as a voltage divider on signals coming out of the Arduino
- ☐ You can run the 3.3 V signals directly into the Arduino without any problems
- ☐ More advanced level shifters: <https://www.sparkfun.com/products/12009>
- ☐ 74HC4050 High to low level shifter chip is also an option



# Talking to an MSP430

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- ☐ The MSP430 launchpad already runs at 3.3 V, so hooking up the ESP8266 is easy
- ☐ If you want the familiarity of the Arduino IDE/coding style you can use Energia ([energia.nu](http://energia.nu))
- ☐ Many Arduino examples will work

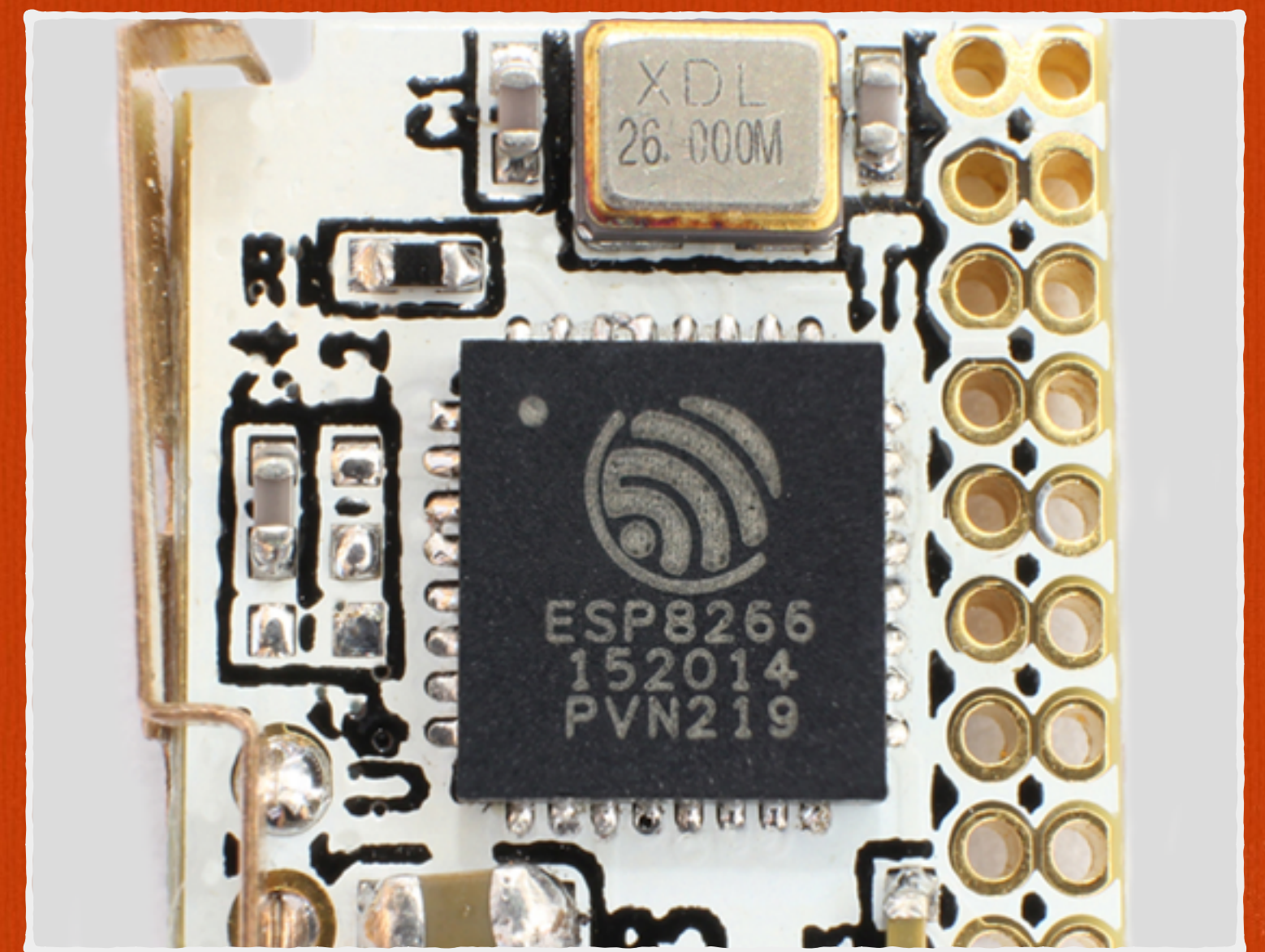


# **Many variations of the module**

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- ☐ **There is a lot of different modules with this chip**
- ☐ **Primary difference is number of pins broken out and antenna configuration**
- ☐ **Some also have metal shielding over the components**







# Using the module stand alone

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- ☐ Some people started hacking on these shortly after they got out
- ☐ Updating the firmware on the microcontroller
- ☐ NodeMCU - LUA runtime
- ☐ Developing directly using the Espressif SDK



# Internet of Things

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- ☐ These modules are designed for IoT
- ☐ If used correctly, one of these modules can run for a year on 2 AA batteries
- ☐ Relatively hacker/maker friendly



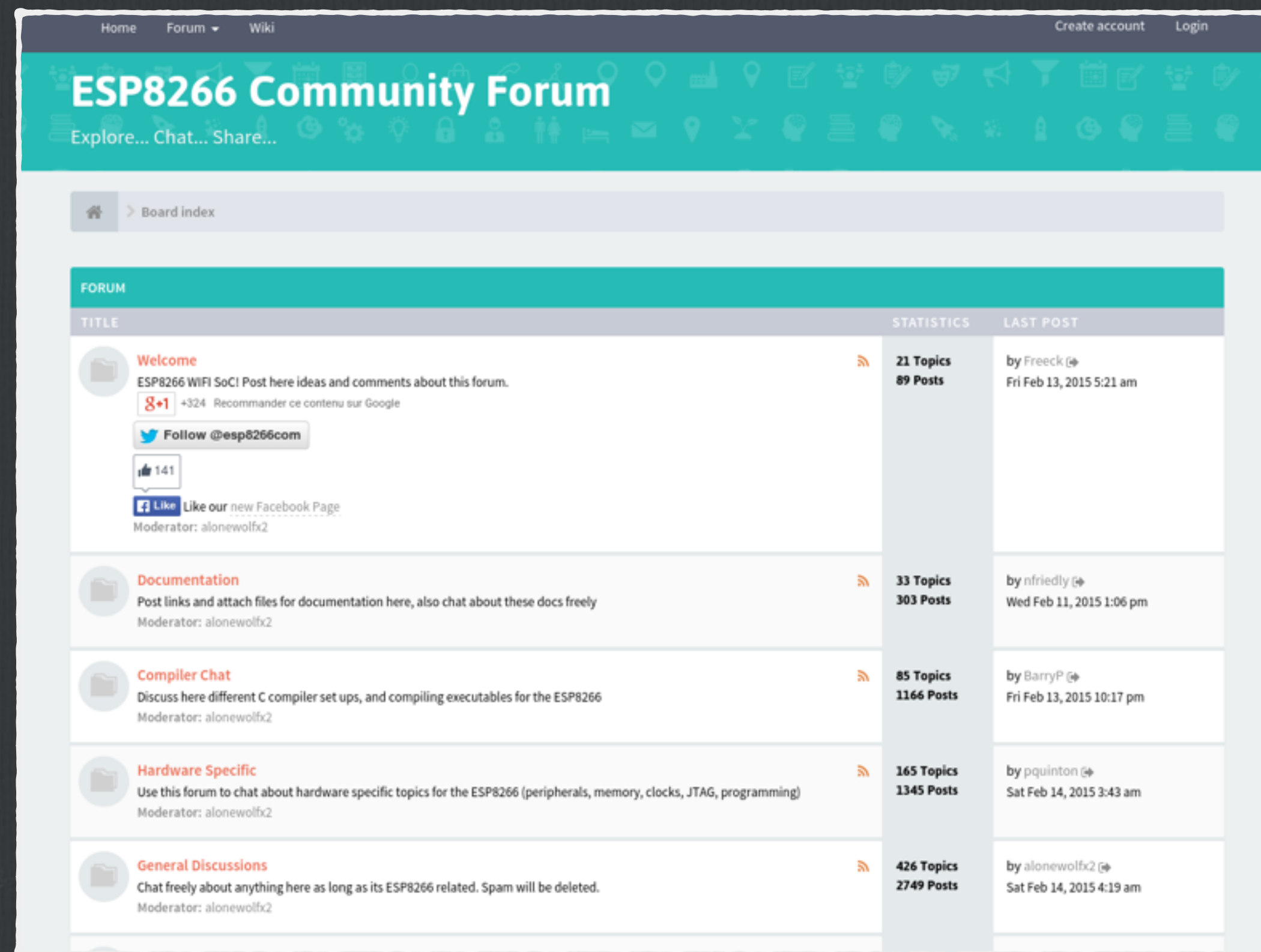
# Cloud data collection

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- ☐ Somewhere to put measured data
- ☐ [data.sparkfun.com](http://data.sparkfun.com) - “phant” open source platform
- ☐ [thingspeak.com](http://thingspeak.com) - also an open source platform



# Forum with a lot of information



☐ [esp8266.com](http://esp8266.com)

☐ Grouped into different aspects of the ESP8266

☐ Including a section on running LUA on it



# Hands-on ideas

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- ☐ Get an Arduino or MSP430 Launchpad to connect to a server through the ESP8266 using AT commands
- ☐ Update a module with the NodeMCU firmware
- ☐ Connect to a server via LUA code or run a web server on the module



# Documentation today

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- ☐ Feel free to use the wiki page on this event and add in links to good information if you find something

**[https://labitat.dk/wiki/ESP8266\\_networking](https://labitat.dk/wiki/ESP8266_networking)**

- ☐ I have already put in a few links to get you started
- ☐ Take a lot of pictures (eg. with your phone) so that there is a bit of documentation afterwards